

**REVISION OF THE INTERTIDAL ALEOCHARINE GENUS
AMBLOPUSA CASEY AND DESCRIPTION OF THE NEW GENUS
PARAMBLOPUSA (COLEOPTERA: STAPHYLINIDAE)¹**

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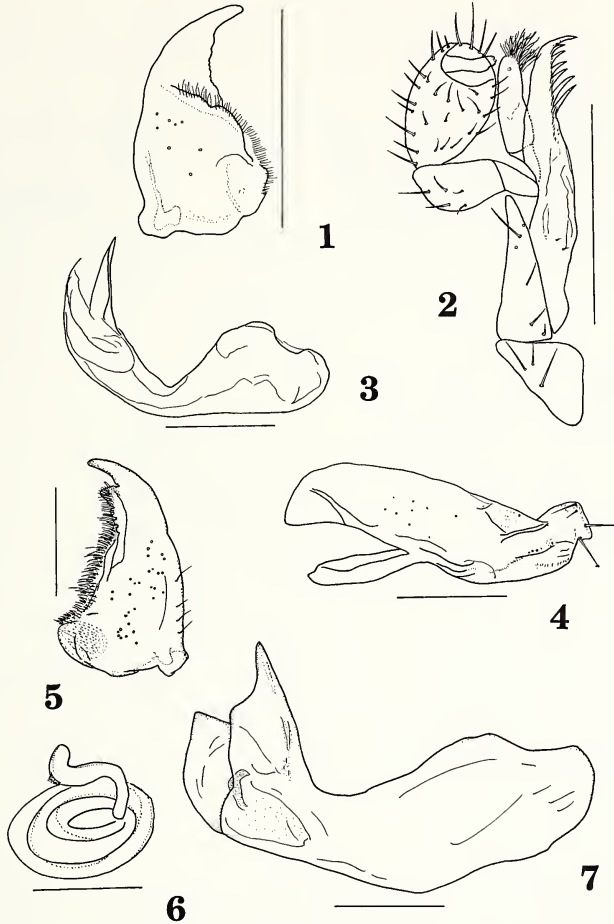
Abstract.—A systematic revision of the aleocharine genus *Amblopusa* Casey is presented. *Amblopusa* Casey is redescribed, and three species are recognized, two of which are new (*A. alaskana* Ahn and Ashe and *A. hokkaidona* Ahn and Ashe). Late instar larvae of *A. alaskana* Ahn and Ashe are described. *Boreorhadinus* Sawada is synonymized under *Amblopusa* Casey and *Boreorhadinus pacificus* Sawada is synonymized under *A. brevipes* Casey. Type and paratypes of *A. alaskana* and *A. hokkaidona* are designated. Lectotype is designated for *A. brevipes*. New genus *Paramblopusa* is described to contain *A. borealis*. Lectotype and paralectotypes are designated for *P. borealis*. A key is provided for separation of the genera *Amblopusa* and *Paramblopusa* and the known species of *Amblopusa*, and illustrations of diagnostic features are presented.

Members of the aleocharine genus *Amblopusa* Casey are confined to the seashore of Pacific North America and Japan. The genus was first described and characterized by Casey in 1893 based on the new species *A. brevipes* from the coast of Alaska. Later, Casey (1906) described an additional species, *A. borealis* from the coast of Queen Charlotte Islands (Massett). In 1911, Casey described another species, *A. pallida* from Vancouver Island (Victoria). However, *A. pallida* was synonymized under *A. brevipes* by Fenyés (1918). Therefore, currently two valid species have been proposed in the genus *Amblopusa*.

Cladistic analyses of the tribe Liparocephalini (Ahn and Ashe, in press), and discovery of two undescribed species, one of which was associated with larvae from Alaska (USA) and the other from Hokkaido (Japan), and the syntype series of *A. brevipes* and *A. borealis* Casey in the collections of the NMNH provided us with the opportunity to revise the genus *Amblopusa* Casey and to describe the new genus *Paramblopusa*.

In this paper we redescribe *Amblopusa* Casey and *A. brevipes* Casey, describe two new species (*A. alaskana* and *A. hokkaidona*) and associated late instar larvae of *A. alaskana*, synonymize *Boreorhadinus* Sawada under *Amblopusa* Casey and *Boreorhadinus pacificus* Sawada under *A. brevipes* Casey, and describe the new genus *Paramblopusa* to contain *A. borealis* Casey.

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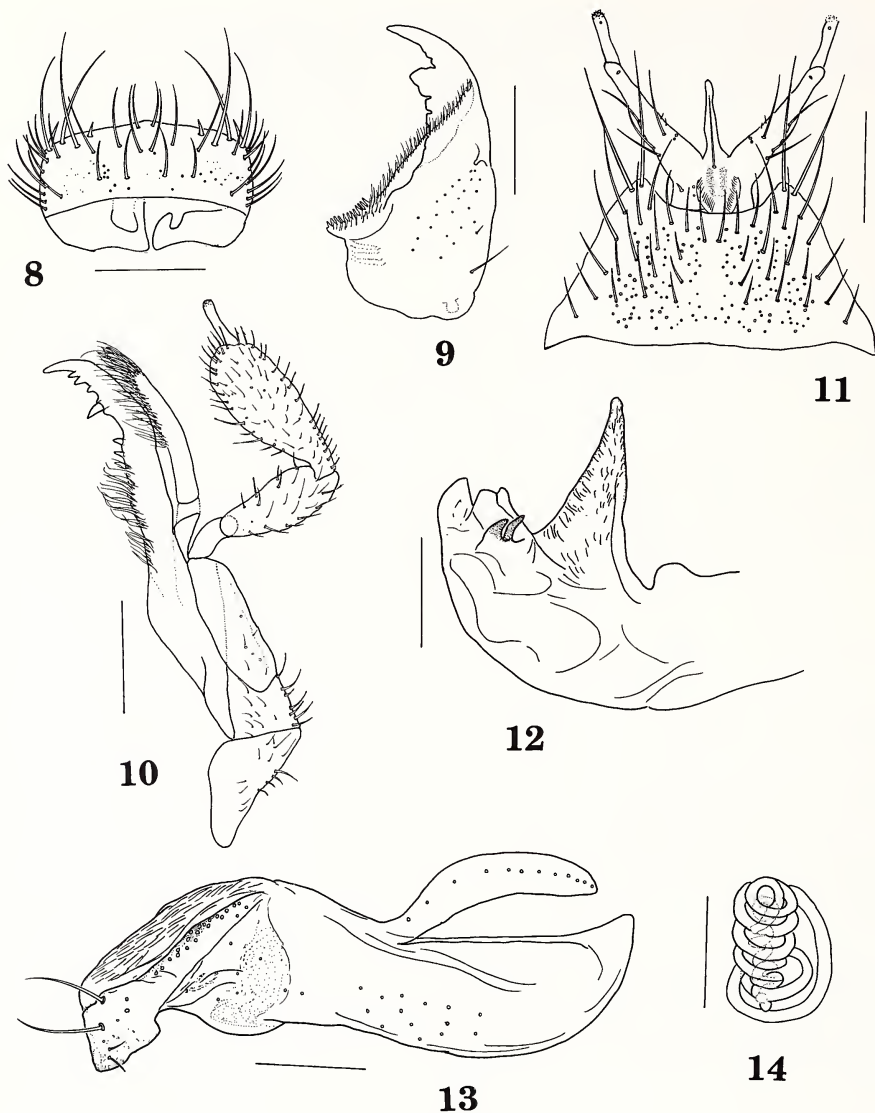
Figs. 1-7. *Amblopusa hokkaidona* Ahn and Ashe, 1-4 and *Amblopusa brevipes* Casey, 5-7. 1, Mandible, ventral aspect; 2, Maxilla, dorsal aspect; 3, Median lobe, lateral aspect; 4, Paramere, lateral aspect; 5, Mandible, dorsal aspect; 6, Spermatheca, dorsal aspect; 7, Median lobe, lateral aspect. Scale, 0.1 mm.

Amblopusa Casey

Amblopusa Casey, 1893: 355, 1906: 354, 1911: 212; Fenyés, 1918: 104; Bernhauer and Scheerpeltz, 1926: 550; Blackwelder, 1952: 48; Moore, 1956: 127; Hatch, 1957: 148; Moore and Legner, 1975: 339, 1976: 532; Seevers, 1978: 172.

Boreorhadinus Sawada, 1991: 147. **New synonym.**

Diagnostic Combination. Among aleocharine genera with 4-4-5 tarsal formula members of *Amblopusa* are easily recognized by the combination of: short body pubescence; very small eyes (ratio of eye length to head length less than 0.1); transverse labrum (Fig. 8); lacinial setae only on mesal surface (Figs. 2 and 10); several



Figs. 8-14. *Amblopusa alaskana* Ahn and Ashe. 8, Labrum, dorsal aspect; 9, Mandible, ventral aspect; 10, Maxilla, dorsal aspect; 11, Labium, dorsal aspect; 12, Median lobe, lateral aspect; 13, Paramere, lateral aspect; 14, Spermatheca, dorsal aspect. Scale, 0.1 mm.

galeal setae only on mesal surface (Figs. 2 and 10); one medial seta on labium or none (Fig. 11); mentum more or less trapezoidal and v setae absent; ratio of pronotal length to elytral length ratio 1.0-1.3; mesocoxal cavities contiguous; metasternum longer than half length of mesocoxal cavity; anterior margin of abdominal tergites III-VI deeply and broadly V-shaped; abdominal tergites III-VII strongly impressed

at base; distal part of abdominal tergite X not sclerotized; hind wings absent; distinctive secondary sexual characteristics; and occurrence in the intertidal zone of seashores.

Description. Small; body length 1.4–3.0 mm. Body shape narrow, flattened and parallel-sided. Body color variable: dark brown, reddish brown, brown, or light brown. Body pubescence with short microsetae more or less uniformly distributed and macrosetae scattered.

HEAD. Slightly deflexed, ≈ 1.0 – 1.1 times as long as wide. Eyes very small; ratio of eye length to head length less than 0.1. Neck absent. Microsetae dense, macrosetae absent. Antenna with 11 antennomeres; antennomeres 2–3 each shorter than preceding; each antennomere with several microsetae.

MOUTHPARTS. Labrum (Fig. 8) transverse; major setae distinct, additional setae present, sensilla on anterior margin; epipharynx with many pores medially. Mandibles (Figs. 1, 5, 9) with apices more or less acute and slightly curved downward; prostheca well-developed, membranous with fibrils. Maxilla (Figs. 2 and 10) with galea and lacinia elongate; galea shorter and narrower than lacinia or same size, corneous, its apex densely pubescent with long filiform setae, and a row of setae only on mesal surface; lacinia more or less acutely pointed, internal surface with comb of single row of 8–10 well separated spines followed by several setae, or internal surface with large, strongly curved apical tooth and 4 short spines more apically and 1 larger spine behind these 4, and a distinctive row of several setae only on mesal surface; maxillary palpus with 4 articles, robust, article 3 ovoid or incrassate and longer than 2, 4 narrow distally with indistinct sensilla. Labial palpi (Fig. 11) with 2 articles, substyliform and elongate; twin pores and median pore present or absent; ligula elongate, entire at apex; prementum with or without 1 medial seta, real pores always present, pseudopores present or absent, basal pores always absent, setal pores present or absent; a pair of indistinct comb-like hypoglossae present adorally. Mentum (Fig. 11) more or less trapezoidal; v setae absent, several long setae present.

THORAX. Pronotum subquadrate, about as long as wide, narrowest at base, widest near apex, basal lines almost straight, apical lines very slightly projected anteriorly; pattern of pubescence with setae subparallel and directed anteriorly in a narrow median strip, others directed antero-laterally; microsetae densely and uniformly distributed, macrosetae sparse, indistinct, mostly at sides. Hypomera large, entirely visible in lateral aspect. Mesocoxal cavities contiguous; mesosternal process acute. Metasternum medium-sized. Tibiae without spinules; tarsal formula 4-4-5; claws more or less elongate and curved.

ELYTRA. Elytra 0.8–0.9 times as long as pronotum; lateral length greater than medial length, microsetae numerous, directed more or less posteriorly, uniformly distributed, macrosetae sparse, mostly at sides. Hind wings absent.

ABDOMEN. General shape broad at base and sides uniformly converging to rounded apex; microsetae numerous, directed posteriorly, uniformly distributed; macrosetae inconspicuous, sparse. Anterior margin of abdominal tergites III–VI deeply and broadly V-shaped. Tergites III–VII strongly impressed at base. Sternites III–VII constricted or not constricted at base. Tergite X with 4 pairs of distinct major setae, numerous unsclerotized additional setae present.

SECONDARY SEXUAL CHARACTERISTICS. Sternite VIII of male prolonged posteriorly as broad triangular projection. Female unmodified.

AEDEAGUS. Median lobe (Figs. 3, 7, 13). Paramere (Figs. 4, 14).

SPERMATHECA. (Figs. 6, 12) Long, slender, coiled.

Type Species. *A. brevipes* Casey, designated by Fenyés (1918).

Distribution. From Alaska to California in North America, and Hokkaido (Japan).

Biology and Ecology. Members of the genus *Amblopusa* inhabit the mid-littoral zone of rocky shores, which contains *Fucus* and barnacles (Moore and Legner 1976). They are often found associated with *Diaulota* and *Liparocephalus*. Tens of individuals of *A. alaskana* have been observed under one boulder at the low-littoral zone of the seashore covered with thousands of pebbles (pers. obs.)

KEY TO THE SPECIES OF THE GENUS *AMBLOPUSA*

- 1. Mandible with indistinct serration on internal surface (Fig. 1); lacinia with ≈10 spines of subequal size in a row near apex (Fig. 2); galea not distinctly shorter and narrower than lacinia; lengths of anterior and middle tarsomere 4 subequal to each of 1, 2, and 3; apical process of median lobe not projected upward (Fig. 3) *A. hokkaidona*
 Mandible with small and irregular serration on internal part (Figs. 5 and 9); lacinia distinctive, with large, strongly curved apical spine; 4 short spines more medially and 1 large spine behind these (Fig. 10); galea shorter and narrower than lacinia; length of anterior and middle tarsomeres 4 subequal to 1 + 2 + 3 together; apical process of median lobe projected upward 2
- 2. Body length 1.9–2.2 mm; ligula of labium short, ≈0.3 times length of apparent article 1 of labial palpus; pronotum not longitudinally impressed; abdominal sternites IV–VI constricted at base; aedeagus as in Figure 7 *A. brevipes*
 Body length 2.4–3.0 mm; ligula (Fig. 11) relatively long, almost half length of labial palpus; pronotum slightly impressed longitudinally; abdominal sternites not constricted at base; aedeagus as in Figures 13 and 14 *A. alaskana*

Amblopusa hokkaidona, new species

Description. Body length 1.4 mm. Body color dark brown or brown.

Head ≈1.1 times as long as wide. Antennomeres 4–10 transverse. Labrum very slightly projected anteriorly, sensilla on anterior margin. Mandibles (Fig. 1) with indistinct internal serration, without median tooth. Labial palpi with 2 articles, article 1 ≈2 times length of article 2, twin pores and median pore absent. Submentum with widely scattered punctures and setae, with distinct microsculpture. Article 3 of maxillary palpus ovoid. Lengths of anterior and middle tarsomere 4 subequal to each of 1, 2, and 3. Pronotum subquadrate. Elytra ≈1.9 times as long as wide; ≈0.9 times as long as pronotum.

AEDEAGUS. Median lobe (Fig. 3). Paramere (Fig. 4).

Type Series. Holotype, male, and allotype, female, each labeled as follows: 'JAPAN, Hokkaido, Akkeshi, Tokotan, 15 June 1994, K. J. Ahn: Holotype (or Allotype), *Amblopusa hokkaidona* Ahn and Ashe, Desig. K. J. Ahn and J. S. Ashe, 1994.' Both holotype and allotype are deposited in the Snow Entomological Museum, University of Kansas, Lawrence, Kansas. Paratypes, 2 (1 on slide), same data as type.

Distribution. Hokkaido, Japan.

Amblopusa brevipes Casey

Amblopusa brevipes Casey, 1893: 356; Bernhauer and Scheerpeltz, 1926: 550; Moore, 1956: 128; Hatch, 1957: 149; Moore and Legner, 1975: 339.

Amblopusa pallida Casey, 1911: 212.

Boreorhadinus pacificus Sawada, 1991: 147. **New synonym.**

Description. Body length 1.9–2.2 mm. Body color reddish brown or brown.

Head about as long as wide. Antennomeres 4–10 transverse, 3–11 increasing in width toward apex. Labrum slightly projecting anteriorly, sensilla of anterior margin present. Mandible (Fig. 5) with irregular serration. Labial palpi with 2 articles, substyliform, article 2 ≈ 0.3 times length of 1; ligula ≈ 0.3 times length of article 1; twin pores and median pores present, prementum without pseudopores medially and laterally, without basal pores; setal pores present. Maxilla with galea shorter and narrower than lacinia; article 3 palpus ovoid; internal surface of lacinia with large spine apically, 4 short spines more medially and 1 large spine behind these. Submentum with numerous punctures and setae; ratio of size of punctures to average distance between punctures ≈ 0.3 . Pronotum subquadrate. Lengths of anterior and middle tarsomere 4 subequal to tarsomeres 1 + 2 + 3 together. Elytra ≈ 1.7 times as long as wide, ≈ 0.8 times as long as pronotum.

AEDEAGUS. Median lobe (Fig. 7).

SPERMATHECA. (Fig. 6).

Type series. Lectotype, male, here designated, in the National Museum of Natural History, Washington, D.C., with labels as follows: 'Ft. Wrangell, Alaska, Wickham, Casey bequest 1925; Lectotype, *Amblopusa brevipes* Casey, Desig. K. J. Ahn and J. S. Ashe, 1994'.

Material Examined. CANADA: British Columbia, Massett (CAS, 3). UNITED STATES: Alaska: Ft. Wrangell, Wickham, 1891, T. L. Casey (CAS, 1; KSEM, 1); California: Marin Co.: Bolinas Beach, 30 March 1971, D. Giuliani (UCR, 1).

Distribution. From California to Alaska.

Comments. Unfortunately, repeated attempts to obtain a loan of the type series of *Boreorhadinus pacificus* Sawada from Japan were not successful. Nevertheless, We are confident that *B. pacificus* is synonym of *A. brevipes* because detailed descriptions and extensive figures by Sawada (1991) agree with *A. brevipes* very well.

Amblopusa alaskana, new species

Description. Body length 2.4–3.0 mm. Body color dark brown.

Head about as long as wide. Antennomeres 7–10 transverse, 3–11 increasing in width toward apex. Labrum (Fig. 8) slightly projecting anteriorly, sensilla present. Mandible (Fig. 9) with irregular serration. Labial palpi (Fig. 11) with 2 articles, substyliform, article 2 ≈ 0.3 times length of article 1; ligula long, more than half length of article 1 of palpus; medial seta present or absent; twin pores and median pores present; prementum without pseudopores medially and laterally, without basal pores, setal pores present. Maxilla (Fig. 10) with galea much shorter and narrower than lacinia; article 3 of palpus dilated; internal surface of lacinia with large spine apically, 4 short spines more medially and 1 large spine behind these. Submentum with numerous densely arranged punctures and setae; ratio of setal width to average

distance between punctures $\approx 0.3\text{--}0.4$. Pronotum subquadrate, with slight medial longitudinal impression. Lengths of anterior and middle tarsomeres 4 subequal to tarsomeres 1 + 2 + 3 together. Elytra ≈ 0.9 times as long as pronotum.

AEDEAGUS. Median lobe (Fig. 13). Paramere (Fig. 14).

SPERMATHECA. (Fig. 12).

Type Series. Holotype, male, and allotype, female, each labeled as follows: 'USA, Alaska, Seward, 24 May 1994, K. J. Ahn; Holotype (or Allotype), *Amblopusa alaskana* Ahn and Ashe, Desig. K. J. Ahn and J. S. Ashe, 1994.' Both holotype and allotype are deposited in the Snow Entomological Museum, University of Kansas, Lawrence, Kansas. Paratypes, 64 (4 on slides), same data as type; 2, USA, Alaska, Seward, 25 May 1994, K. J. Ahn (KSEM); 3, Alaska, Valdez, 1 Aug. 1978, P. P.-H. Madaline and S. Arnaud (CAS); 1, Alaska, Unalaska, Dutch Harbor, 14 Aug. 1907, Van Dyke (CAS); 2, Alaska, Unalaska, Dutch Harbor, 9 July 1907, Van Dyke (CAS).

Distribution. Alaska: Dutch Harbor, Valdez, Seward.

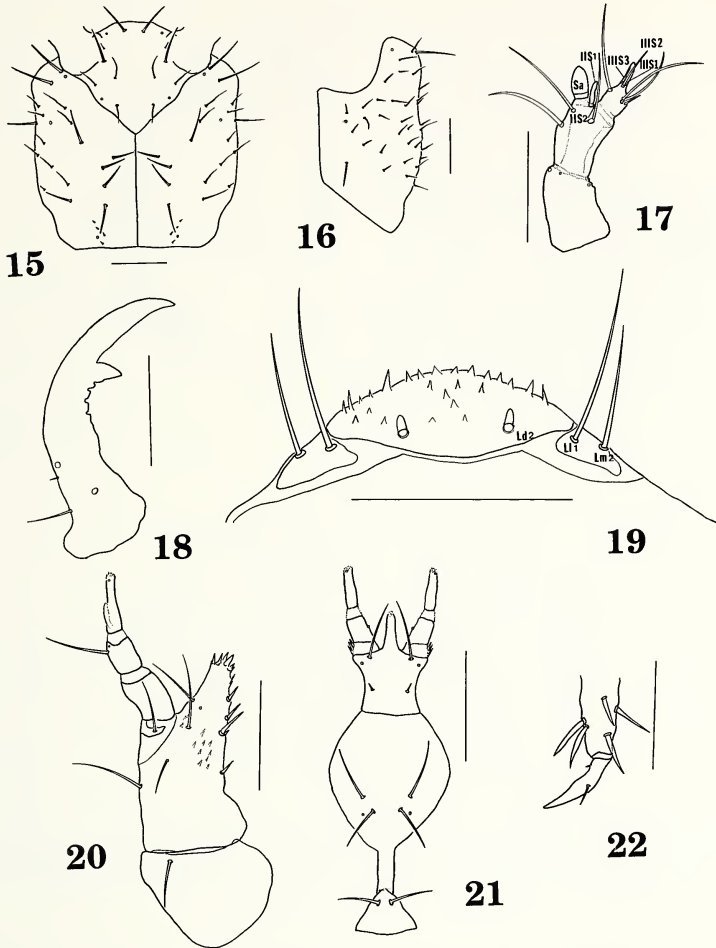
Description of late instar larvae of *Amblopusa alaskana*
(Chaetotaxic system according to Ashe and Watrous 1984)

Diagnostic Combination. Larvae of *Amblopusa alaskana* can be distinguished from all other described aleocharine larvae by the combination of: elongate antenna (Fig. 17) with IIS3, IIS4 absent; distinctive pattern of spines and setae on labrum (Fig. 19); mandible (Fig. 18) pointed and hooked apically; large median tooth on each mandible and distinct serration between median tooth and molar region; labium (Fig. 21) with 3–5 short spines on lateral margin; maxilla (Fig. 20) with broad stipes; very narrow and unsclerotized submentum; tarsus (Fig. 22) with 1 robust dorsal spine; urogomphus (Fig. 26) fused to main body; presence of 4 large, sclerotized hooks on pygopodium (Fig. 26); and, many additional setae (in comparison with standard patterns described by Ashe and Watrous) on head, pronotum, mesonotum and abdominal tergites.

Description. Length of 2.5 mm. General body shape elongate, flattened, parallel-sided. Color light brown.

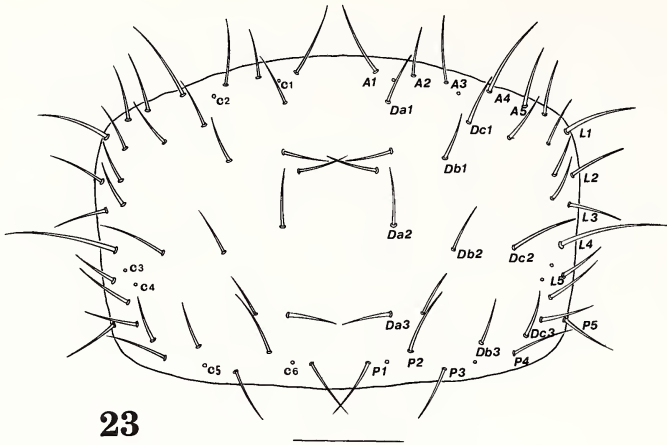
HEAD. About 0.9 times as wide as long. Stemma indistinct on each side, very small. Ecdysial sutures distinct and complete from antennal fossae anteriorly to base of head posteriorly. Setation as in Figures 15 and 16. Antenna (Fig. 17) with 3 articles; article 1 elongate, ≈ 1.4 times as long as wide, with 5 campaniform sensilla around apical margin; article 2 ≈ 0.9 times length of article 1; article 3 ≈ 0.5 times length of article 2; article 2 with 2 solenidia in addition to sensory appendage; sensory appendage robust, inflated, acorn-shaped and faintly fenestrate, its length almost equal to length of article 3; IIS1 spiniform, very short, ≈ 0.2 times as long as IIS2; IIS2 elongate, digitiform, about as long as sensory appendage, IIS3 absent; article 3 with 3 solenidia in addition to sensory appendage; IIS3 digitiform, faintly fenestrate, IIS4 absent.

MOUTHPARTS. Labrum (Fig. 19) with 3 distinct setae on each side and several short and robust spines, L11 and Lm2 on small lateral sclerite distinctly separated from main body of labrum by suture; seta Ld1 absent, seta Ld2 very short, robust and inflated. Mandibles (Fig. 18) with symmetrical, pronounced preapical tooth and

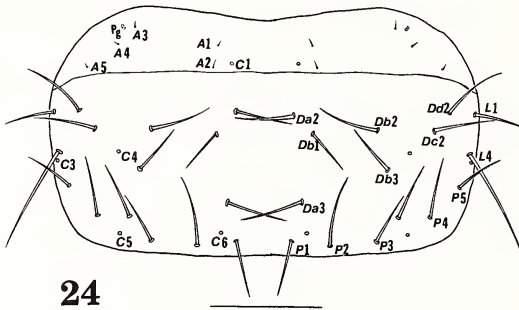


Figs. 15–22. *Amblopusa alaskana* Ahn and Ashe, late instar larva. 15, Head, dorsal aspect; 16, Head, ventral aspect; 17, Antenna, ventral aspect; 18, Mandible, dorsal aspect; 19, Labrum, dorsal aspect; 20, Maxilla, ventral aspect; 21, Labium, dorsal aspect; 22, Tarsus, dorsal aspect (symbols according to Ashe and Watrous 1984). Scale, 0.1 mm.

large median tooth, distinct serration between median tooth and molar region; 2 setae in basi-lateral half, distal seta very small and basal seta large. Maxilla (Fig. 20) with cardo broadly oval, with one seta on ventro-lateral surface; stipes broad at base, not distinctly separated from mala, surface with 2 large setae, 1 on disk and 1 near lateral margin; mala with apex acute, 5 spiniform setae on mesal region with large seta most basal; scale at base of most basal seta spinose, very short, less than 0.1 times length of seta, several short spinules scattered on dorsal surface; maxillary palpus with 3 articles and basal crescentic palpifer; article 1 elongate, ≈ 0.8 times as wide as long; article 2 ≈ 0.8 times as long as article 1; article 3 ≈ 0.7 times as long



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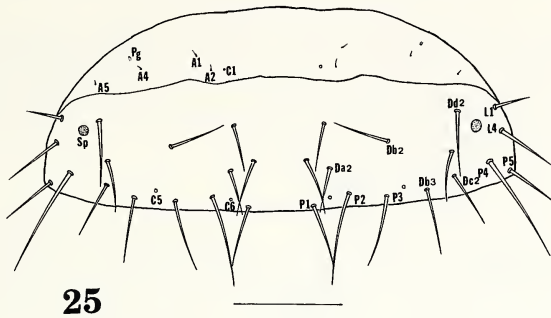


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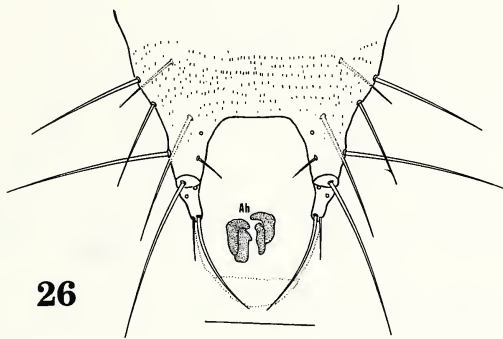
Figs. 23–24. *Amblopusa alaskana* Ahn and Ashe, late instar larva. 23, Pronotum, dorsal aspect; 24, Mesonotum, dorsal aspect (symbols according to Ashe and Watrous 1984). Scale, 0.1 mm.

as article 1 and 2 together; article 3 with basal digitiform sensory appendage on external surface. Labium (Fig. 21) consisting of indistinctly separated prementum, mentum, and very narrow, unsclerotized submentum; ligula elongate; labial palpus with 2 articles, article 2 \approx 1.4 times as long as article 1; submentum with 1 pair of setae; mentum with 2 pairs of setae and 1 pair of campaniform sensilla; prementum with 2 pairs of setae and 1 pair of campaniform sensilla; 3–5 short spines present on antero-lateral margin of labium.

THORAX. Pronotum (Fig. 23) transverse; chaetotaxy with anterior, lateral, and posterior rows complete and discal rows complete (A1–A5, L1–L5 and P1–P5 present, Da1–Da3, Db1–Db3, Dc1–Dc3, and Dd1–Dd2 present; 8 additional setae present, 2 between Da1 and Da2, 1 between Da3 and Db3, 1 between Dc3 and P4, 1 between L5 and P5, 2 between Dc1 and L3, 1 between A5 and L1), campaniform sensilla C1–6 present. Mesonotum (Fig. 24) transverse; chaetotaxy with anterior, lateral, and posterior rows complete and discal rows complete (A1–A5, L1 and L4,



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Figs. 25–26. *Amblopusa alaskana* Ahn and Ashe, late instar larva. 25, Abdominal tergite I, dorsal aspect; 26, Abdominal tergite IX, dorsal aspect (symbols according to Ashe and Watrous 1984). Scale, 0.1 mm.

P1–P5, Da2 and Da3, Db1–Db3, Dc2, and Dd2 present; 1 additional seta present between Db3, P3, and P4), campaniform sensilla C1, C3, C4, C5, and C6 present. Metanotum similar to mesonotum.

LEGS. Tarsus (Fig. 22) with 1 robust dorsal spine.

ABDOMEN. Abdominal tergites I–VII transverse; abdominal tergite I (Fig. 25) chaetotaxy with anterior, lateral, and posterior rows complete and discal rows complete (A2, A4, A5, L1, L4, P1–P5, Da2, Db2, Dc2, and Dd2 present); 4 additional setae present; 1 more anterior seta (A3), 2 more above Da2, 1 more between Db2, Dc2, and P4. Tergal gland reservoir slightly sclerotized, with distinctive pattern of internal hoop-like sclerotizations; 4 gland ducts, in form of coiled tubules. Abdominal tergites IX–X as in Fig. 26; urogomphi fused to main body, short, ≈ 0.2 times length of tergite IX, apex not pointed beyond subapical seta, each urogomphus displaced from main body of tergum IX on short posterior elongation of postero-lateral margin of tergum. Pygopodial hooks (2 pairs) large, sclerotized, and well-developed. **Material Examined.** UNITED STATES: Alaska: Seward, 24 May 1994, K. J. Ahn (KSEM, 5).

Remarks. The larvae were described here collected in association with adults of *A. alaskana* in Alaska; there were no other larvae or adults of any other aleocharine species present; and, larvae of other possible species of intertidal Aleocharinae are known to us and are distinctly different from these larvae. Therefore, we have described them as probable larvae of *A. alaskana*.

Paramblopusa, new genus

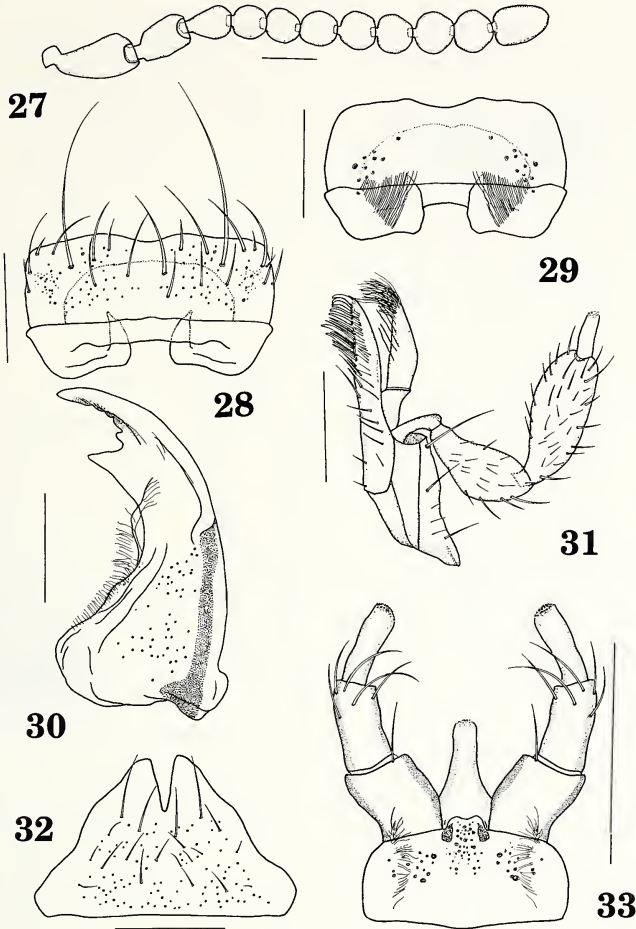
Diagnostic Combination. Among aleocharine genera with 4-4-5 tarsal formula members of *Paramblopusa* are recognized by the combination of: short body pubescence; small eyes (ratio of eye length to head length less than 0.2); labrum (Fig. 28) transverse; mandibles (Fig. 30) with small teeth between apex and median tooth; lacinial setae only on mesal surface (Fig. 31); several galeal setae only on mesal surface (Fig. 31); one medial seta on labium or none (Fig. 32); mentum (Fig. 33) triangular, deeply incised with V-shaped emargination at apex and *v* setae absent; mesocoxal cavities contiguous (Fig. 34); metasternum longer than half length of mesocoxal cavity; abdominal tergites III-VII strongly impressed at base; distal part of abdominal tergite X not sclerotized (Fig. 36); hind wings absent; distinctive secondary sexual characteristics (Fig. 35); and occurrence in the intertidal zone of seashores.

Description. Small; body length 2.5-3.4 mm. Body shape narrow, flattened and parallel-sided. Body color variable: dark brown, reddish brown, brown, or light brown. Body with short microsetae more or less uniformly distributed and macrosetae scattered.

HEAD. Slightly deflexed, ≈ 0.9 times as long as wide. Eyes very small; ratio of eye length to head length less than 0.2. Neck absent. Microsetae dense, more or less uniformly distributed, macrosetae absent. Antenna (Fig. 27) with 11 antennomeres; antennomeres 2-3 each shorter than preceding; each antennomere with several microsetae.

MOUTHPARTS. Labrum (Fig. 28) transverse; major setae distinct, additional setae present; epipharynx (Fig. 29) with many pores scattered in medial row. Mandibles (Fig. 30) with apices more or less acute, slightly curved downward at tip; prostheca well-developed, membranous, with fibrils. Maxilla (Fig. 31) with galea and lacinia elongate; galea corneous, apex densely pubescent with long filiform setae, and row of setae only on mesal surface; lacinia more or less acutely pointed, internal surface with comb of single row of 8-10 well separated spines followed by several setae, and a distinctive row of several setae only on mesal surface; maxillary palpus with 4 articles, robust, article 3 ovoid and longer than 2, 4 narrow distally with indistinct sensilla. Labial palpi (Fig. 32) with 3 articles, substyliiform; twin pores and median pore absent; ligula elongate, entire at apex; prementum with 1 medial seta or none, real pores always present; a pair of indistinct comb-like hypoglossae present adorally. Mentum (Fig. 33) more or less triangular, deeply incised with V-shaped emargination at apex; *v* setae absent, several long setae present.

THORAX. Pronotum subquadrate, about as long as wide, narrowest at base and widest near apex, basal lines almost straight, apical lines slightly projected anteriorly; pattern of pubescence with setae subparallel and directed anteriorly in narrow median strip, others directed antero-laterally; microsetae densely and uniformly distributed,

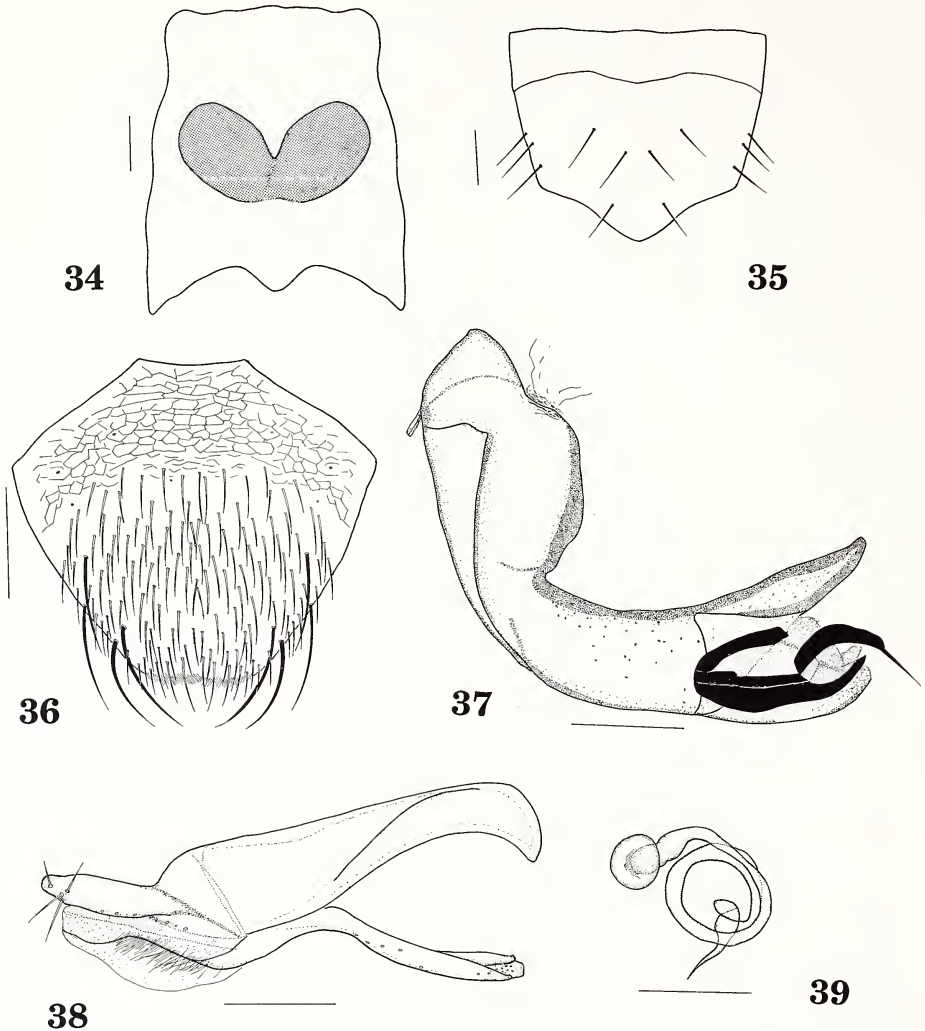


Figs. 27–33. *Paramblopusa borealis* Casey. 27, Antenna, dorsal aspect; 28, Labrum, dorsal aspect; 29, Epipharynx, dorsal aspect; 30, Mandible, ventral aspect; 31, Maxilla, dorsal aspect; 32, Mentum, dorsal aspect; 33, Labium, dorsal aspect. Scale, 0.1 mm.

macrosetae sparse, indistinct, mostly at sides. Hypomera large, entirely visible in lateral aspect. Mesocoxal cavities (Fig. 34) contiguous; mesosternal process acute. Metasternum mid-sized. Tibiae without spinules; tarsal formula 4-4-5; claws elongate and curved.

ELYTRA. Elytra 0.8–0.9 times as long as pronotum; lateral length greater than medial, microsetae numerous, directed posteriorly, uniformly distributed, macrosetae sparse, mostly at sides. Hind wings absent.

ABDOMEN. General shape broad at base, and sides uniformly converging to rounded apex; microsetae numerous, directed posteriorly, uniformly distributed; macrosetae inconspicuous, sparse. Tergites III–VII strongly impressed at base. Sternites



Figs. 34–39. *Paramblomusa borealis* Casey. 34, Mesocoxal cavities, dorsal aspect; 35, Sternite VIII of male, dorsal aspect; 36, Tergite X, dorsal aspect; 37, Median lobe, lateral aspect; 38, Paramere, lateral aspect; 39, Spermatheca, dorsal aspect. Scale, 0.1 mm.

III–VII constricted at base. Tergite X (Fig. 36) with 4 pairs of distinct major setae and numerous unsclerotized additional setae.

SECONDARY SEXUAL CHARACTERISTICS. Sternite VIII (Fig. 35) of male prolonged posteriorly as a broad triangular projection. Female unmodified.

AEDEAGUS. Median lobe (Fig. 38). Paramere (Fig. 39).

SPERMATHECA. (Fig. 37) Long, slender, coiled.

Type Species. *A. borealis* Casey, by monotypy.

Distribution. From Alaska to Oregon.

Remarks. *A. borealis* Casey has been included in the genus *Amblopusa* with *A. brevipes* Casey because members of the two species superficially resemble each other. However, cladistic analysis (Ahn and Ashe, in press) indicates that *A. borealis* is not part of a monophyletic lineage with other species of *Amblopusa*. Instead *A. borealis* is sister group to the species of *Liparocephalus* and *Diaulota* and together with these two genera form the sister group to the other members of *Amblopusa*. Consequently, it must be classified under a different generic name. Therefore, we have described the new genus *Paramblopusa* to contain *A. borealis*, which is characterized by two apomorphic features: triangular mentum with deeply incised V-shaped emargination at apex and teeth present between mandibular apex and median tooth.

Paramblopusa borealis (Casey), **new combination**

Amblopusa borealis Casey, 1906: 355; Bernhauer and Scheerpeltz, 1926: 550; Moore, 1956: 128; Hatch, 1957: 149; Moore and Legner, 1975: 339.

Description. Length 2.5–3.4 mm. Body color variable: dark brown, reddish brown, brown, or light brown.

Head about 0.9 times as long as wide. Ratio of length of compound eyes to length of head ≈ 0.2 . Antennomeres (Fig. 27) 4–10 almost moniliform. Labrum (Fig. 28) slightly sinuate anteriorly, no sensilla on anterior margin, punctures more or less uniformly distributed. Mandible (Fig. 30) with 4 small teeth between apex and median tooth. Labial palpi (Fig. 32) with 3 articles, 2 and 3 subequal in length, and slightly longer than 1, each much narrower than preceding; twin pores and median pores absent, prementum with several pseudopores medially and laterally, basal pores and setal pores not apparent. Mentum (Fig. 33) triangular, deeply incised with V-shaped emargination at apex, with several long setae. Submentum with numerous deep punctures. Pronotum subquadrate. Lengths of anterior and middle tarsomere 4 subequal to tarsomeres 1 + 2 + 3 together. Elytra ≈ 1.4 as long as wide; ≈ 0.8 – 0.9 times as long as pronotum. Anterior margin of abdominal tergites III–VI straight.

AEDEAGUS. Median lobe (Fig. 38). Paramere (Fig. 39).

SPERMATHECA. (Fig. 37).

Type Series. Lectotype, male, here designated, in the National Museum of Natural History, Washington, D.C., with labels as follows: 'Casey bequest 1925; Lectotype, *Amblopusa borealis* Casey, Desig. K. J. Ahn and J. S. Ashe, 1994.' Paralectotype, 1, same data as lectotype except for 'Metlakatla, B. Col., Keen.'

Material Examined. CANADA: British Columbia: Massett (CAS, 4); Caspaco, Skeena River Estuary, 11 Aug. 1973, G. Schulte (KSEM, 2); Beaver Harbor, 13 Sept. 1970, W. G. Evans (KSEM, 2). UNITED STATES: Alaska: Saldovia, 11 July 1899, T. Kincaid (MCZ, 1); Unalaska, Dutch Harbor, 9 July 1907, Van Dyke (CAS, 6); 29 June 1907, Van Dyke (CAS, 2); Valdez, 1 Aug. 1978, P., P.-H., Madaline & S. Arnaud (CAS, 2); Haines, Port Chilkoot, 7 Aug. 1973, G. Schulte (KSEM, 1); Prince William Sound, Sawmill Bay, 4 Aug. 1973, G. Schulte (KSEM, 2); Homer, Coal Bay, 24 May 1994, K. J. Ahn (KSEM, 19); Seward, 25 May 1994, K. J. Ahn (KSEM, 2); Arrandale Cannery, Chatham Sd., 8 Aug. 1946, E. F. Ricketts (FMNH, 2); Red Bay, Prince of Wales Isl., 13–14 Sept. 1951, B. Malkin, tide flats under rocks (FMNH, 2); Kah Sheets Bay, Kupreanof Isl, 31 Aug. 1951, B. Malkin, Tide

Table 1. The differences between members of the genera *Amblopusa* Casey and *Paramblopusa* Ahn and Ashe.

	<i>Amblopusa</i>	<i>Paramblopusa</i>
Shape of median tooth of right mandible	Not triangular	Triangular
Teeth between mandibular apex and median tooth	Absent	Present
Shape of mentum	Not triangular	Triangular, deeply incised with V-shaped emargination at apex
Anterior margin of abdominal tergites III-VI	Deeply and broadly V-shaped	Straight
Apical lobe of paramere	More or less diamond-shaped	Long

flats under rocks (FMNH, 7). Washington: Kitsap Co.: Bainbridge Is., 13 Oct. 1974, D. Giuliani (UCR, 3); Oregon: Lincoln Co.: Newport, Yaquina Estuary, 22 Aug. 1973, G. Schulte (KSEM, 7); Coos Co.: Coos Bay, East Side, 26 Aug. 1973, G. Schulte (KSEM, 2).

Distribution. From Alaska to Oregon.

DISCUSSION

Casey (1893) placed *Amblopusa* in *Bolitocharides* based on the 4-4-5 tarsal formula and 11-articled antennae. He noted that *Amblopusa*, *Diaulota*, and *Liparocephalus* could be a well isolated group of genera among *Bolitocharides* based on inhabiting the Pacific coast, elytra very short, tibiae short, devoid of lateral spinules, long sparse hairs present, and tarsi very short.

Fenyés (1918), who next mentioned *Amblopusa*, placed it in the tribe *Bolitocharini* (group *Liparocephali*) based on the number of the tarsal joints (4-4-5), the number of antennal articles (11), and the number of segments of the maxillary (4), and labial palpi (2 or indistinctly 3).

Bernhauer and Scheerpeltz (1926) and Hatch (1957) likewise classified the genus based on Casey's description and Fenyés's placement.

Chamberlin and Ferris (1929) compared the structure of members of *Amblopusa*, *Diaulota*, and *Liparocephalus* and concluded that *Amblopusa* is congeneric with *Diaulota*. However, Moore (1956) revealed that they incorrectly identified *D. vandykei* as *A. brevipes*. He placed *Amblopusa* in the subtribe *Phytosi* and made mention of the systematic relationships of the genus *Amblopusa* among the *Phytosi*.

The latest mention of the aleocharine genus *Amblopusa* was by Seevers (1978). He removed the subtribe *Phytosina* from the tribe *Bolitocharini* and raised it to tribal status (tribe *Phytosini*) and placed *Amblopusa* in the tribe *Phytosini* based primarily on tarsal formula (4-4-5), elytra shorter than pronotum, and hind wings absent.

From the time of its description, *Amblopusa* Casey has been consistently classified with a number of other intertidal aleocharine genera in the tribe *Phytosini*, or its equivalent.

We compared the structure of members of *Amblopusa* to that of members of several intertidal phytosine genera. Our comparative examination revealed that both *Amblopusa* and *Paramblopusa* are well-supported monophyletic group. However, cladistic analysis (Ahn and Ashe, in press) indicates that members of *Paramblopusa* is not part of a monophyletic lineage with other species of *Amblopusa*. Instead they are sister group to the species of *Liparocephalus* and *Diaulota* and together with these two genera form the sister group to the other members of *Amblopusa*.

The differences between members of the genera *Amblopusa* and *Paramblopusa* are presented in Table 1.

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